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CALLING NAME CUSTOMIZATION IN A TELECOMMUNICATIONS ENVIRONMENT

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Field of the Invention

5   The present invention relates to enhanced telecommunications network features, and particularly relates to improving the usability of caller identification services.

10   Background of the Invention

Modern telecommunications systems carry telecommunications traffic based on routing and control information that is exchanged between network elements comprising, for example, the Public Switched Telephone

15   Network (PSTN). As these communication networks have evolved, so has the sophistication of their underlying signaling and control networks. Examples of telecommunications network signaling systems include Common Channel System Signaling No. 7 (SS7), an

20   International Telecommunications Union Standard, and advanced intelligent networks (AIN) signaling. SS7, for example, provides a basis for call setup, management, and tear down. Of more concern to telecommunications system users, such signaling systems provide enhanced calling

25   features.

Capitalizing on the network intelligence provided by SS7 or other types of network signaling implementations, telecommunication service providers are able to offer individual users the ability to interact with the

30   telecommunications environment and control certain aspects of its operation. For example, individual users can selectively redial the number of the last incoming call, temporarily forward calls to a selected number, and with the right equipment, determine a caller's identity

at a glance without having to pick up the phone. This last feature, that is the telecommunication network's ability to provide calling party information to the called party before the called party actually answers the

5 phone, which has found broad everyday use.

Indeed, caller identification services have proven to be one of the most popular calling feature enhancements available. Generally referred to as "caller ID," calling identification services involve the delivery

10 of a calling party's dialable number (DN), and optionally the calling party's name, to a called party. Oftentimes, the caller ID services are referred to as calling number delivery (CND) and calling name delivery (CNAM), respectively. With caller ID, information relating to

15 the subscriber line originating the call travels, via some form of signaling system, through the telecommunications network, and is provided to the called party's premises equipment (e.g., telephone) by the Central Office or local exchange switch that serves the

20 called party.

Delivery of the calling party's name is particularly useful in that it provides a more natural way for called parties to determine the identify of calling parties. Simply put, delivering the calling party's name obviates

25 the need for the called party to mentally associate the incoming number with a particular name. Regardless of the type of network signaling system involved, the calling party identification information generally comes from some form of subscriber database, such as directory

30 listing information. Thus, the name associated with a given calling subscriber's line by the telecommunications service provider is usually the name delivered to parties called by that given subscriber. This CNAM information is fixed in the sense that the telecommunications network

providing the CNAM information for a given calling
subscriber does not change or alter the information,
providing the same name information for each call placed
through a given subscriber line.

5   Limitations of existing CNAM delivery options are
apparent. For example, a single telephone line is
oftentimes registered to only one or two subscribers, but
is associated with multiple users. A telephone serving a
college dormitory room represents a common example of

10   this type of situation. In the dormitory room scenario,
each roommate likely calls a different group of friends
and associates from the same telephone, leaving whatever
CNAM information that is provided to parties called from
that phone of questionable value, since the subscriber

15   name associated with the telephone is fixed regardless of
who is actually placing the call. Other examples, such
as a residential service telephone shared by multiple
family members, highlight essentially the same problem
with existing CNAM delivery systems.

20   Even when the calling party is the subscriber
associated with the phone line by the telecommunications
service provider, the subscriber may desire the
flexibility to change CNAM information depending upon
whom he or she is calling. This desire is easily

25   understood by contrasting the CNAM information
appropriate for a business or formal call versus the
information appropriate for a call placed to a friend or
family member.

Accordingly, there remains a need for improvements

30   to caller identification services that allow individual
telephone users to adjust the calling name information
provided to call recipients. Ideally, these improvements
would include provisions for insuring that such custom or

programmable calling name information capability is used
responsibly and only in appropriate contexts.

Summary of the Invention

5   The present invention enables the delivery of
customizable calling party identification information
within a telecommunications network. Calling party
information delivered to the telecommunications network
for calls placed from the subscriber line can be changed

10 depending upon the number dialed, or can be set to a
persistent desired value, which can later be changed
again. In one embodiment, one or more lists (screen
lists) of dialable numbers are identified in association
with the subscriber line, with each of the lists being

15 associated with a desired calling name. A call placed to
any number appearing in one of the lists causes the
calling party name information to be set to the
corresponding desired value. Feature codes, as can be
activated by dialing special numeric codes using customer

20 premises equipment (CPE) associated with the subscriber
line, may also be used to select and set the desired
calling name for a single call, or for all calls until
changed again.

When screen lists are used, the local exchange

25 switch preferably has access to the screen lists
associated with the subscriber line. Thus, the local
exchange switch determines if a number dialed through the
subscriber line is one for which calling party name
customization is desired. If so, the local exchange

30 switch may access locally or remotely stored name
information to get the particular custom name desired for
delivery in association with calls placed to the
particular number dialed. The name information may be
part of a larger subscriber database and can be included

in the local exchange switch, or accessed remotely through the telecommunications network, using, for example, SS7 or AIN signaling protocols. Alternatively, the local exchange switch may have some other type of

5   communications link with the database.

In one embodiment, the local exchange switch receives a defined numeric code from the CPE associated with the subscriber line, and this causes the local exchange switch to use a custom name value. The custom

10   name value may be used just for that call, or may be used until changed or reset. The feature code may provide selection information such that the local exchange switch can determine which one of a number of predefined names are desired for use with the subscriber line. In this

15   scenario, the predefined custom names are preferably stored data within the local exchange switch, or are accessible to the local exchange switch via the telecommunications network. Alternatively, the CPE may provide custom name information in association with the

20   feature code, such that the local exchange switch receives not only the activation command, but the calling name custom value from the CPE as well. If the CPE provides the custom name information, it is preferable that the CPE have the ability to receive one or more

25   custom names as input by a user of the CPE.

The ability to program custom names through the CPE may be an intrinsic capability of the CPE, or may be enabled in the CPE based on interaction with the local exchange switch, such as when the CPE is ADSI-compliant,

30   and an ADSI server is associated with the local exchange switch. The utility of custom name programmability is useful in the context of both feature code-based and screen list-based custom name editing. The present invention contemplates a variety of ways for allowing

users associated with the subscriber line to define desired custom name values. These methods include programming via the CPE, using visual menus if the CPE has a data display, or otherwise through voice menu

5 systems. Other methods are available and include allowing subscribers to set custom name information by using PCs or other Internet access appliances to gain access to a Web server having custom name editing capabilities. Manual data entry may also be used to

10 simply update stored information relating to custom names based on information received from the subscriber.

The present invention also provides for screening custom name values to ensure that no subscribers attempt to configure their calling party name information

15 inappropriately. Such screening is ideally done at the time that the desired custom name value is entered, which is typically in advance of any call that might trigger use of the custom name value. Screening may be done in the CPE, the local exchange switch, or in another

20 processing system associated with the telecommunications network, or in any combination thereof. If necessary, screening may be done at the time of call processing during an active telecommunications call. However, this may have the disadvantage of adding additional call

25 processing time.

The present invention also provides the ability to customize calling party number information in certain instances. While the potential to abuse this feature in a way that defeats the underlying value of calling party

30 identification information is present, customizable number information may have significant value within a private exchange where it may be desirable to associate calls placed from different subscriber lines with a common number. There are other circumstances and

instances where it may be desirable to allow users to adjust subscriber line calling number identification information. Other aspects and features of the present invention will become apparent to those ordinarily

5   skilled in the art upon review of the following description of exemplary embodiments of the invention in conjunction with the accompanying figures.

Brief Description of the Drawing Figures

10   Figure 1 illustrates a simplified exemplary telecommunications system in which the present invention may be advantageously practiced.

Figure 2 provides simplified flow logic for list-based selective calling party identification information

15   customization according to one embodiment of the present invention.

Figure 3 illustrates an exemplary variation of the telecommunications system of Figure 1.

Figure 4 provides simplified flow logic for feature-

20   code-based custom calling party identification information selection according to one embodiment of the present invention.

Figure 5 provides simplified flow logic for an exemplary variation of the logic of Figure 4.

25   Figure 6 provides a simplified illustration of an exemplary local exchange switch for use in the telecommunications systems of Figures 1 and 3.

Detailed Description of the Preferred Embodiments

30   Figure 1 illustrates a simplified telecommunications system 10 in which an exemplary embodiment of the present invention may be advantageously practiced. A local exchange switch 12, such as might be found in a telecommunications Central Office (CO), connects a

subscriber line 14 and associated customer premises equipment (CPE) 16 to a telecommunications network 18. The local exchange switch 12 optionally includes stored data in the form of a screen list 20, and stored data in

5 the form of a subscriber information database 22. Either or both the screen list 20 and subscriber information database 22 may reside remote from the local exchange switch 12 in association with the telecommunications network 18, however it is preferable to maintain at least

10 the subscriber's screen list 20 in the local exchange switch 12. While not illustrated to preserve clarity, the local exchange switch 12 typically supports a large number of individual subscriber lines 14.

In support of caller identification services, the

15 local exchange switch 12 provides the telecommunications network 18 with calling party identification information associated with the subscriber line 14 for calls placed via the CPE 16. Typically, this calling party identification information includes a fixed subscriber

20 name value and a fixed dialable number value that have been assigned to the subscriber line 14 by a telecommunications service provider. With the present invention, individual subscribers can customize at least a portion of this calling party dedication information.

25 In some embodiments, such customization is enabled using screen lists 20 and subscriber information databases 22.

Figure 2 illustrates simplified logic associated with a screen list-based implementation for the network architecture of Figure 1. While the simplified logic

30 illustrated focuses on customization of calling name information, it should be understood that the logic shown may be additionally or alternatively applied to customization of calling number information. However, given the potential for abuse, it may be preferable to

limit calling number customization to special circumstances. Circumstances appropriate for calling number customization are discussed below.

Processing begins (block 100) when a user dials a
5   number using the CPE 16. The dialed number is received by the local exchange switch 12 through the subscriber line 14 (block 102). The local exchange switch 12 compares the dialed number with the appropriate entries in the screen list 20 (blocks 104 and 106). While a
10   screen list 20 may contain other information, its utility with respect to the present invention derives from its inclusion of one or more lists of dialable numbers for which the subscriber associated with the subscriber line 14 desires customized calling party identification
15   information.

For example, the subscriber may provide the telecommunications service provider associated with the local exchange switch 12 with five different dialable numbers (or groups of numbers) for which a different
20   calling party name is desired. In this case, the screen list 20 would include entries for the five different dialable numbers (or groups of numbers), and could include the custom name information, although such information may be more conveniently stored in the
25   subscriber information database 22. Thus, using the screen list 20, the local exchange switch 12 determines if the dialed number matches any numbers in the screen list 20 for which custom name information is defined.

If a match exists between the number dialed and a
30   number stored in the screen list 20 (block 108), the local exchange switch 12 gets the custom name information corresponding to the matching stored number in the screen list 20 (blocks 110 and 112). As noted, the custom name information is preferably stored in the subscriber

information database 22, which may be resident in the
local exchange switch 12, or the local exchange switch 12
may remotely query the subscriber information database
22. Various techniques provide for remote querying, and

5 include SS7-based network signaling and AIN-based
signaling. These and other remote database access
techniques will be readily understood by those skilled in
the art.

Once the custom name information has been retrieved

10 (block 110), the local exchange switch 12 adjusts the
calling party identification information to reflect the
custom name value (block 114). The local exchange switch
12 provides the telecommunications network 18 with a
calling party identification message for the call being

15 originated from the subscriber line 14 (block 116) and
processing ends (block 120). Ideally, the calling party
identification message includes a generic name parameter,
along with fixed name and number parameters, and
optionally includes a generic number parameter. In

20 implementing calling party name customization, the local
exchange switch 12 adjusts the generic name parameter to
a desired value, while leaving the fixed name and number
parameters unaltered. This allows the telecommunications
network 18 to maintain accurate call records based on

25 fixed information associated with the subscriber line 14,
while allowing called parties to receive the custom name
information contained in the generic name parameter.

If no match exists between the number dialed and the
numbers contained in the screen list 20 (block 108), the

30 local exchange switch 12 maintains either the current
calling party identification message, or uses a default
calling party identification message (block 118). The
default calling party name will generally be the fixed
name value included in the calling party identification

message as explained above. Those skilled in the art will recognize opportunities exist for varying the logic associated with resetting the generic calling name parameter to a default value, a null value, or preserving

5   its current custom setting.

With the present invention, callers can change their calling name as desired. For example, college roommates sharing a single telephone line may set the calling name when making a call in order to allow the receiving party

10   to recognize who is calling. This is particularly useful the roommates that are not the subscribers on record at the telephone company. Alternatively, home based businesses sharing a telephone line for residential and business purposes can set the calling name for the

15   business for business calls and set the calling name as the family name for personal calls.

Figure 3 illustrates an exemplary variation of the simplified telecommunications system 10 introduced in Figure 1. Rather than using a screen list 20 to

20   determine when customized calling party dedication information is desired for a given call originated from the subscriber line 14, calling party identification information customization is controlled by feature codes and, optionally, name messages received from the CPE 16.

25   Those skilled in the art will readily appreciate the use of other feature codes in existing telecommunications systems to enable enhanced calling services like automatic callback (e.g., dialing "*69"). Depending upon how supporting feature codes are implemented, calling

30   party identification information customization may still use the subscriber information database 22, may use a private database 24 within the CPE 16, or may not rely on databases for storage of custom identification information at all.

While Figures 4 and 5 illustrates two of the numerous variations available with feature code control of custom calling party dedication information, it should be noted that feature code functionality may be combined with screen list-based calling party identification information customization for even greater flexibility in implementing the present invention. Further, Figures 4 and 5 are discussed in light of the architecture of Figures 1 or 3. Figure 4 illustrates an embodiment where feature codes received from the CPE 16 control calling party identification information customization.

Processing begins (block 200) with the local exchange switch 12 determining whether it has received a customization feature code in association with a call being placed from the CPE 16 connected to the subscriber line 14 (block 202). Preferably, the feature code is augmented with additional selection information sufficient to allow the local exchange switch 12 to identify a desired custom name value if multiple custom values have been defined for the subscriber line 14 (blocks 204 and 206). This might, for example entail receiving a feature code plus an additional numeric code corresponding to a specific custom name value stored in the subscriber information database 22.

Processing continues with the local exchange switch 12 adjusting the custom name portion of the calling party identification message to reflect the desired custom name information (block 208). The local exchange switch 12 then provides the calling party identification message to the telecommunications network 18 as part of its call completion operations (block 210) and processing ends (block 214). If the customization feature code is not received in association with the call (block 202), the

local exchange switch 12 maintains the current or default identification message information (block 212).

Figure 5 illustrates a variation of the simplified logic introduced in Figure 4. Processing begins (block 300) with the local exchange switch 12 determining whether it has received a customization feature code from the CPE 16 connected with the subscriber line 14 (block 302). In contrast with the logic of Figure 4, where the customization information was stored in the local exchange switch 12 or elsewhere in the telecommunications network 18, customization information in this embodiment is stored in the private database 24 and received from the CPE 16 (block 304). The customization information received from the CPE 16 may be a custom name, a custom number, or any combination thereof. Additionally, the feature codes may be used to indicate whether the customized settings should be persistent (i.e., used for subsequent calls), or simply applied to the current or next call. Software within the local exchange switch 12 may also provide functionality related to setting the persistence of customization settings for the calling party identification information in all embodiments of the present invention.

As alluded to earlier, the present invention may include customization of calling number information as well, but with consideration for the need to limit such customization to environments where its use is appropriate and not subject to abuse. In some environments, the local exchange switch 20 may serve as a private exchange for a group of subscriber lines 14. An example of this might be a company with a primary business number and a plurality of additional numbers associated with the phone system extensions assigned to individual employees. In these circumstances, it may be

desirable to have the calling number identification information for outgoing calls placed from the individual extensions adjusted to the primary business number. Also, an employee working at a temporary extension may

5   wish to temporarily preprogram the extension so that their name (and possibly, their normal extension number) is included in the calling party identification information sent for calls placed from the temporary extension. In the context of Figure 5, an employee could

10 simply pick up a given extension handset (not shown) and use a feature code to temporarily change the name and number identification information for that extension. Of course, the utility of these capabilities extend to environments other than just work environments, and may

15 be combined with other embodiments of the present invention.

After the local exchange switch 12 receives the custom calling party identification information (name and/or number) from the CPE (block 304), the local

20 exchange switch 12 optionally performs screening of the received information (block 306) to ensure that the custom information received is not inappropriate. This screening step may be employed in any of the embodiments of the present invention, and may take on a variety of

25 forms, as those skilled in the art will readily appreciate. As noted, screening may be performed as a part of call processing, however this may undesirably increase the length of time required to complete a call.

Preferably, custom value screening is performed at

30 the time of entry. Screening may be performed in the CPE 16, the local exchange 12, or associated processing systems in the telecommunications network 18, or in any combination thereof. Once optional screening is complete, the local exchange switch 12 adjusts the custom

parameters in the calling party identification message
for which customization is desired (block 308). The
customized calling party identification message is
provided to the telecommunications network 18 by the
5   local exchange switch 12 (block 310) and processing ends
(block 314). If no customization feature code was
received by the local exchange switch 12 (block 302), the
local exchange switch 12 maintains the current or default
calling party identification message information (block
10   312), and processing ends (block 314).

A variety of methods exist for getting desired
custom calling party identification information to the
local exchange switch 12. By example, the information
may come from data storage within or associated with
15   local exchange switch 12, or may come from data storage
accessible via the telecommunications network 18, or may
come from the CPE 16. The co-pending Application Serial
No. 09/643,510, entitled *System and Method of Controlling
Calling Party Information Delivery* and commonly assigned
20   with the instant application, relates to enhancing
delivery control of calling party identification
information and provides examples of how subscribers may
access and edit data items such as screen lists 20 and
subscriber information databases 22, and is incorporated
25   herein by reference.

Figure 6 illustrates the simplified architecture of
an exemplary embodiment of the local exchange switch 12
discussed above. The architecture illustrated for the
local exchange switch 12 is a simplified representation
30   of a DMS-100 local exchange switch. The DMS-100 is
manufactured by Nortel Networks Limited, having a
business address at World Trade Center of Montreal, 380
St. Antoine Street West, Montreal, Quebec. A typical
DMS-100 implementation includes a computing module 26 and

supporting software 28. The software 28 includes program
instructions supporting overall operation of the DMS-100,
and provides functionality for enhanced calling services.
The screen list 20 and the database 22 may be included in
5   the DMS-100 in association with the computing module 26
and software 28. A "switching fabric" module 30
interfaces a plurality of subscriber lines 14 (telephony
lines) to the network 18 via a subscriber line interface
32 and a network interface 34. The DMS-100 further
10   includes an operations/administration & maintenance
module 36.

In one embodiment, the DMS-100 includes storage
elements configured to hold the screen list 20 and the
database 22, in or associated with the computing module
15   26. In such configurations, the DMS-100 has local access
to customized CID information for connected subscribers.
In other configurations, the DMS-100 may access a remote
database 22 for at least a portion of the custom CID
information. The switching fabric module 30 may comprise
20   logical and physical switches for interconnecting the
subscriber lines 14 with the telecommunications network
18 through the subscriber line and network interfaces 32
and 34, respectively. The operations/maintenance &
administration module 36 provides an interface for select
25   service and upgrade activities.

DMS-100 local switching systems support the Common
Channel Signaling Interface No. 7, which is compatible
with SS7 standards, and are available with a variety of
software options supporting a variety of advanced calling
30   features. While not critical to understanding the
present invention, detailed operations for each of these
elements are thoroughly explained in various service and
product manuals available from Nortel Networks
Corporation.

However, it should be understood that the features and capabilities imparted by the present invention are not dependent upon a particular organization or structure for the local exchange switch 12, the CPE 16, or the

5   telecommunications network 18. It is sufficient that the telecommunications network 18 support the delivery of some form of caller identification information messages that may be selectively edited to reflect custom name and number values as defined by or in association with the

10 individual subscribers for their respective subscriber lines.

Those skilled in the art will readily appreciate that the present invention permits substantial variation in terms of implementation. The foregoing discussion and

15 accompanying drawings explain and illustrate exemplary embodiments of the present invention but should not be construed as limiting the scope of the present invention. In general, the present invention relates to allowing telecommunications system subscribers and users in

20 general to define custom calling party identification information, and to control when and how such custom information is used. Thus, the scope of the present invention is limited only by the scope of the claims included herein, and the reasonable equivalents thereof.

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